

Applicants: Joseph A. Fernando, et al.

Response to Office Action Dated: January 17, 2007

Response Filed: July 17, 2007

II. CLAIMS LISTING

The below listing of claims replaces all prior versions and listings of claims in the present application:

1. (Previously Presented) A device for the treatment of exhaust gases comprising:
 - a housing having an inlet at one end and an outlet at an opposite end through which exhaust gases flow;
 - a fragile structure resiliently mounted within said housing, said fragile structure having an outer surface and an inlet end surface at one end in communication with said inlet of said housing and an outlet end surface at an opposite end in communication with said outlet end of said housing;
 - a support element disposed between the housing and the fragile structure, said support element comprising an integral, substantially non-expanding ply of melt-formed ceramic fibers comprising about 40 weight percent to about 60 weight percent alumina and about 60 weight percent to about 40 weight percent silica, said fibers having been prepared by a process including heat treating said fibers under a time-temperature regimen comprising heat treating said fibers at a temperature of 990°C to at least 1050°C for greater than 1 hour such that the treated fibers have about 5 to about 50 percent crystallinity as detected by x-ray diffraction, and a crystallite size of about 50Å to about 500Å; and

wherein said support element exerts a minimum residual pressure for holding said fragile structure within said housing of one of at least 4 psi after 200 cycles of testing at 900°C or at least 10 psi after 1000 cycles of testing at 750°C.
2. (Original) The exhaust gas treatment device of claim 1, wherein the fragile structure has a perimeter, at least a portion of which is integrally wrapped by the support element.
3. (Cancelled)

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4. (Cancelled)
5. (Original) The exhaust gas treatment device of claim 1, wherein the fibers have average diameters ranging from about 1 microns to about 14 microns.
6. (Original) The exhaust gas treatment device of claim 5, wherein the fibers have average diameters ranging from about 3 microns to about 6.5 microns.
7. (Original) The exhaust gas treatment device of claim 1, wherein the fibers have less than about 10% shot.
8. (Original) The exhaust gas treatment device of claim 1, wherein the support element provides a minimum residual pressure for holding the fragile structure within the housing after 200 cycles of testing at 900°C of at least 10 psi.
9. (Original) The exhaust gas treatment device of claim 1, wherein the support element is prepared by the process comprising melt spinning the fibers; heat treating the fibers; and incorporating the fibers into mat form.
10. (Original) The exhaust gas treatment device of claim 1, wherein said exhaust gas treatment device is a catalytic converter.
11. (Original) The exhaust gas treatment device of claim 1, wherein said exhaust gas treatment device is a diesel particulate trap.

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12. (Previously Presented) A device for the treatment of exhaust gases comprising:
a housing having an inlet at one end and an outlet at an opposite end through which exhaust gases flow;

a fragile structure resiliently mounted within said housing, said fragile structure having an outer surface and an inlet end surface at one end in communication with said inlet of said housing and an outlet end surface at an opposite end in communication with said outlet end of said housing;

a support element disposed between the housing and the fragile structure, said support element comprising an integral, substantially non-expanding ply of melt-formed ceramic fibers comprising about 40 weight percent to about 60 weight percent alumina and about 60 weight percent to about 40 weight percent silica, said fibers having been prepared by a process of heat treating said fibers under a time-temperature regimen comprising heat treating said fibers at a temperature of greater than 1050°C for an effective amount of time such that the treated fibers have about 5 to about 50 percent crystallinity as detected by x-ray diffraction, and a crystallite size of about 50Å to about 500Å;

wherein said support element exerts a minimum residual pressure for holding said fragile structure within said housing of one of at least 4 psi after 200 cycles of testing at 900°C or at least 10 psi after 1000 cycles of testing at 750°C.

13. (Original) The exhaust gas treatment device of claim 12, wherein the fragile structure has a perimeter, at least a portion of which is integrally wrapped by the support element.

14. (Cancelled)

15. (Cancelled)

16. (Original) The exhaust gas treatment device of claim 12, wherein the fibers have average diameters ranging from about 1 microns to about 14 microns.

17. (Original) The exhaust gas treatment device of claim 16, wherein the fibers have average diameters ranging from about 3 microns to about 6.5 microns.

18. (Original) The exhaust gas treatment device of claim 12, wherein the fibers have less than about 10% shot.

19. (Original) The exhaust gas treatment device of claim 12, wherein the support element provides a minimum residual pressure for holding the fragile structure within the housing after 200 cycles of testing at 900°C of at least 10 psi.

20. (Original) The exhaust gas treatment device of claim 12, wherein the support element provides a minimum residual pressure for holding the fragile structure within the housing after 1000 cycles of testing at 750°C of at least 10 psi.

21. (Original) The exhaust gas treatment device of claim 12, wherein the support element is prepared by the process comprising melt spinning the fibers; heat treating the fibers; and incorporating the fibers into mat form.

22. (Previously Presented) The exhaust gas treatment device of claim 12, wherein the fibers are heat treated under a time-temperature regimen of heat treating at a temperature between 1100°C and about 1400°C for at least 1 hour.

23. (Previously Presented) The exhaust gas treatment device of claim 12, wherein the fibers are heat treated under a time-temperature regimen of heat treating at a temperature of at least 1100°C for at least 2 hours.

24. (Previously Presented) The exhaust gas treatment device of claim 12, wherein the fibers are heat treated under a time-temperature regimen of heat treating at a temperature of at least 1200°C for at least 10 minutes.

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25. (Original) The exhaust gas treatment device of claim 22, wherein the support element provides a minimum residual pressure for holding the fragile structure within the housing after 1000 cycles of testing at 750°C of at least 20 psi.

26. (Original) The exhaust gas treatment device of claim 12, wherein said exhaust gas treatment device is a catalytic converter.

27. (Original) The exhaust gas treatment device of claim 12, wherein said exhaust gas treatment device is a diesel particulate trap.

28-40. (Cancelled)

41. (Previously Presented) The exhaust gas treatment device of claim 1, wherein said support element is needed.

42. (Previously Presented) The exhaust gas treatment device of claim 9, wherein said mat is needed.

43. (Previously Presented) The exhaust gas treatment device of claim 12, wherein said support element is needed.

44. (Previously Presented) The exhaust gas treatment device of claim 21, wherein said mat is needed.

45. (Cancelled)

46. (Cancelled)

47. (Previously Presented) A device for the treatment of exhaust gases comprising:

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a housing having an inlet at one end and an outlet at an opposite end through which exhaust gases flow;

a fragile structure resiliently mounted within said housing, said fragile structure having an outer surface and an inlet end surface at one end in communication with said inlet of said housing and an outlet end surface at an opposite end in communication with said outlet end of said housing;

a support element disposed between the housing and the fragile structure, said support element comprising an integral, substantially non-expanding ply of melt-formed ceramic fibers comprising about 40 weight percent to about 60 weight percent alumina and about 60 weight percent to about 40 weight percent silica, said fibers having about 5 to about 50 percent crystallinity as detected by x-ray diffraction, and a crystallite size of about 50Å to about 500Å; and

wherein said support element exerts a minimum residual pressure for holding said fragile structure within said housing of one of at least 4 psi after 200 cycles of testing at 900°C or at least 10 psi after 1000 cycles of testing at 750°C.

48. (Previously Presented) The exhaust gas treatment device of claim 47, wherein the fragile structure has a perimeter, at least a portion of which is integrally wrapped by the support element.

49. (Previously Presented) The exhaust gas treatment device of claim 47, wherein the fibers have average diameters ranging from about 1 microns to about 14 microns.

50. (Previously Presented) The exhaust gas treatment device of claim 49, wherein the fibers have average diameters ranging from about 3 microns to about 6.5 microns.

51. (Previously Presented) The exhaust gas treatment device of claim 47, wherein the fibers have less than about 10% shot.

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52. (Previously Presented) The exhaust gas treatment device of claim 47, wherein the support element provides a minimum residual pressure for holding the fragile structure within the housing after 200 cycles of testing at 900°C of at least 10 psi.

53. (Previously Presented) The exhaust gas treatment device of claim 47, wherein the support element is prepared by the process comprising melt spinning the fibers; heat treating the fibers; and incorporating the fibers into mat form.

54. (Previously Presented) The exhaust gas treatment device of claim 47, wherein said exhaust gas treatment device is a catalytic converter.

55. (Previously Presented) The exhaust gas treatment device of claim 47, wherein said exhaust gas treatment device is a diesel particulate trap.

56. (Previously Presented) The exhaust gas treatment device of claim 47, wherein the support element provides a minimum residual pressure for holding the fragile structure within the housing after 1000 cycles of testing at 750°C of at least 10 psi.

57. (Previously Presented) The exhaust gas treatment device of claim 47, wherein the support element provides a minimum residual pressure for holding the fragile structure within the housing after 1000 cycles of testing at 750°C of at least 20 psi.